

REMARKS

Claims 22-40 were examined in the Office Action mailed July 14, 2005. Claims 25 and 40 were rejected under 35 U.S.C. § 112, 2nd paragraph as unclear. Claims 22-34 and 36-40 were rejected under 35 U.S.C. § 103(a) over a combination of *Silber et al* (DE 198 20 734) and U.S. Patent No. 6,683,347 to *Fujihara*. Claim 35 was rejected over *Silber* and *Fujihara* in combination with *Readdie et al* (US Patent No. 5,254,869). Reconsideration of these rejections is respectfully requested in view of the following remarks.

A. Claims 25 and 40 Clarified to Address 35 U.S.C. § 112 Rejection

Claims 25 and 40 have been amended as suggested to recite a voltage range. Support for this amendment is in claim 7 as original filed herein.

B. Claims 22-34 and 36-40 are Patentably Distinguishable over the Combination of *Silber* and *Fujihara*

Independent claim 22 recites a method of forming a Shottkey barrier diode in which the recited layers are formed in a specified way, first by:

. . . . forming a substrate region of a first conductivity type underneath a semiconductor material layer of the same conductivity type;

This step which forms a plurality (i.e., at least two) epitaxial layers. A plurality of columns of a second conductivity type are formed by implantation in the epitaxial layers ("by successive implants to form a plurality of stacked bubbles") such that

. . . . each one of said doped regions being disposed under said metal layer and being separated from the other doped region and said substrate region by portions of said semiconductor layer,

In contrast,

- *Silber* teaches an epitaxial layer of N type in which P type columns are formed using trenches.
- *Fujihara* teaches alternating conductivity regions achieved by implanting adjacent columns of differing conductivity types over an epitaxial layer. The epitaxial layer does not separate the implanted regions from each other, as recited in claim 22.

- Even in combination, *Silber* taken with *Fujihara* fails to teach the plurality of implanted bubbles of one conductivity type separated from each other by a plurality of epitaxial layers of a different conductivity type, as recited in claim 22.

The precision and speed by which the columnar, implanted bubbles of a single conductivity type are formed in the epitaxial layers of a second conductivity type, pursuant to the claimed invention, result in a simplified method of manufacturing which is capable of producing a multi-drain Schottky barrier diode having a higher voltage breakdown and lower on-resistance.

Because the combination of *Silber* and *Fujihara* fails to teach a plurality of implanted bubbles of one conductivity type separated from each other by a plurality of epitaxial layers of a different conductivity type, as recited in claim 22, claim 22 is therefore patentably distinguishable over the combination. Accordingly, withdrawal of the § 103 rejection of claim 22 is proper and respectfully requested. Dependent claims 23-40 also recite the distinguishing limitations through direct and indirect dependence from claim 22, so that withdrawal of the § 103 rejection of claims 23-40 is therefore requested.

C. Claim 35 is Patentably Distinguishable over the Combination of *Silber*, *Fujihara* and *Readdie*

Although *Readdie* does teach a silicide layer formed over the surface of a semiconductor material, it does not teach the implantation of columns of one conductivity type in a plurality of layers of a second conductivity type, and thus does not provide the teachings relative to claim 22 which are absent from *Silber* and *Fujihara*. According, claim 35, which incorporates the feature of claim 22 by dependency, is patentably distinguishable over the combination of *Readdie*, *Silber* and *Fujihara*. Withdrawal of the § 103 rejection of claim 35 is respectfully requested.


D. Conclusion and Petition for Three-Month Extension

Claims 22-40 being patentably distinguishable over the references of record, withdrawal of the rejections of the July 14, 2005 Office Action is proper and respectfully requested. Should the Examiner be of the opinion that a

phone conference would expedite the prosecution of this case, the Examiner is requested to contact the attorney at the phone number listed below.

Applicant hereby petitions for a Three-Month Extension of Time, extending the due date for response from November 14, 2005 to January 14, 2006. Please charge the petition fee and any other fee associated with this transmittal to Deposit Account No. 50-1123.

Respectfully submitted,



January 13, 2006

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